



# Physical specifications and Mechanical Behavior of Swelling Gypsiferous Soils

Morad Mehri<sup>1\*</sup>, Dariush Jalili<sup>2</sup> and Sohrab Mir Azizi<sup>3</sup>

<sup>1</sup>MSc, Department of Road and Transportation, Khuzestan, Iran;

<sup>2</sup>PhD Candidate, Faculty of Tiran Branch, Islamic Azad University, Esfahan, Iran;

<sup>3</sup>PhD Candidate, Ahvaz Branch, Islamic Azad University, Khuzestan, Iran;

\*Correspondence: mr\_mehry@yahoo.com;

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**Abstract:** Swelling soils which are outspread all over the world cause irrecoverable damages to buildings. This type of problematic soils exists in south west of Mashhad and seems to be the main reason of some damages including cracks in buildings and pavements. The soil profile in this region is mainly gypsum and fine which can be classified as...SM and CL. However, in some parts coarse aggregates are observed. The present research is an attempt to identify the characteristics and swelling property of gypsum soil of this region. To examine this issue, 10 samples containing different gypsum percent were taken from various places in this region. The geotechnical properties of the samples including gypsum content, Atterberg Limits, natural unit weight, dry unit weight and density were investigated. The influence of gypsum amount on swelling potential was then studied. All samples were moulded with identical moisture content and unit weight. The impacts of some other factors such as compaction and cycles of dry and wetting on swelling potential were also investigated. The results of the present research indicate with increasing gypsum content and degree of compaction, swelling potential increases rapidly. It is also shown that with increasing number of cycles the magnitude of maximum swelling potential increases so that after a few cycles remains mainly constant.

**Keywords:** Gypsum soil, swelling, compaction, cycle of wetting and drying.

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## 1. Introduction

In general, soils that undergo settlement (volume reduction) or swelling (increase in volume) after saturation, are categorized as problematic soils [13]. The swelling behavior is usually seen in soils containing enough fine particles. In their natural state, clays may to some extent show swelling (if wet) or contraction (if dry) behaviors [7]. Swelling of this soil type is mainly due to movement of soil particles away from each other in the presence of water as a result of osmotic laws and consequently formation of a thin membrane of water around the soil [12]. Such soils cause a lot of problems around the world, most notable examples of such problems include damage to buildings, roads and pavements. These problems have driven researchers to conduct extensive studies in this field.